



PhD project : 2022-2025

The influence of physico-chemical parameters (T, P and fO_2) on the behaviour of non traditional stable isotopes during mantle partial melting

The isotopic composition of the bulk silicate Earth (mantle + crust) is an important information for our understanding of the formation and evolution of our planet. This composition is nevertheless extremely difficult to determine because the samples at our disposal have all undergone geological processes that affected their isotopic compositions. One of the fundamental processes affecting the isotopic composition of mantle derived rocks (such as basalts and peridotite) is partial melting. The aim of this project is to determine the influence of physico-chemical parameters on the behaviour of non-traditional stable isotopes during partial melting.

The project will be based on two approaches: (1) very high precision isotopic geochemistry and (ii) experimental petrology. The natural samples analyzed will be products (basalts) and residues (peridotites) of mantle melting. The very high-precision analyzes will be carried out at the "Pôle de Spectrométrie Océan (PSO, UBO) » in Brest (France) and experimental petrology experiments will be carried out at the "Laboratoire Magma et Volcans" in Clermont-Ferrand (France).

This research project is part of the ANR ISOMELT project (PI: Pierre Bonnand) which started on February 1, 2022.

Candidates must hold a master degree in Earth sciences or related disciplines. They must have been trained in petrology and geochemistry, have good writing skills, a good understating of data processing tools, and a good autonomy. A first experience in geochemistry (clean room and/or analysis on mass spectrometer) and/or in experimental petrology would also be considered favorably.

Methods: clean room work, isotopic analyzes by TIMS and MC-ICPMS, experimental petrology (1-atmosphere furnace and piston-cylinder), electron microprobe.

The management team is made up of Pierre Bonnand (LGO, UBO) and Gilles Chazot (LGO, UBO) for isotopes geochemistry and Didier Laporte (LMV, UCA) for experimental petrology.

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Link to apply: <https://theses.doctorat-bretagne-iloire.fr/sml/theses-2022> then click on UMR6538 for the list of phd projects.